IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	09/830,769
Applicant	:	Ken Ikoma et al.
Filed	:	April 30, 2001
Title	:	CAMERA AND DEVICE FOR SWITCHING OPTICAL FILTERS
Conf. No.	:	2183
TC/A.U.	:	2615
Examiner	:	Yogesh K. Aggarwal
Customer No.	:	000,116
Docket No.	:	33555

DECLARATION UNDER 37 CFR 1.131 ESTABLISHING PRIOR INVENTION IN A WTO MEMBER COUNTRY AFTER JANUARY 1, 1996

I, as a co-inventor in the above-identified patent application, hereby declare as follows:

1. My residence, post office address, and citizenship are as stated below next to my name.

2. In Japan, a WTO member country, prior to June 28, 1999, I jointly conceived of camera and device for switching optical filters to which the above-referenced U.S. patent application is directed. Exhibit A attached to this declaration is a request for filing a patent application directed to my camera and device for switching optical filters and dated June 28, 1999. Exhibit A also includes a draft specification which was attached to the request and submitted as part of my company's internal invention review process. An English translation of the documents in Exhibit A is attached hereto as Exhibit B.

3. I have read and understood the above-referenced U.S. patent application, including claims 2 to 8 as presently amended.

4. It is my belief that the whole invention set forth in claim 4 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, with reference to Figs. 1, 3 and 4 as shown in Exhibit A (see English translation of labels on pages 17-19 of Exhibit B), my invention included a method of switching optical filters of a camera, the method comprising the steps of:

forming an image on an image pick-up element (105, 113, 303) through a lens (101, 301) provided on a camera body (106) (see Exhibit B, page 4, lines 20-23; page 6, line 25 to page 7, line 3; and page 7, lines 17-19);

converting the image into an electrical signal through the image pick-up element (303), thereby obtaining an image signal (see Exhibit B, page 7, lines 18-19);

detecting a level of the image signal output (steps 402, 404, 409) from the image pick-up element (105, 303) by detecting means (311) (see Exhibit B, page 7, lines 21-22 and page 10, lines 1-3); and

automatically switching (steps 405, 410) between a first optical filter (115, 118) and a second optical filter (116, 117) through optical filter switching means (103, 302) provided on a front surface of the image pick-up element (105, 303) depending on the signal level (steps 404, 409) detected by the detecting means (311) (see Exhibit B, page 10, lines 1-7 and lines 21-24).

5. Further, it is my belief that the whole invention set forth in claim 5, which depends from claim 4 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, my invention included a method of switching optical filters of a camera according to claim 4, as set forth in paragraph 4 above, and further wherein one of the first optical filter and the second optical filter is a color filter (115, 118) and the other is a black-and-white filter (116, 117) (see Exhibit B, page 5, lines 10-12), and wherein the color filter is switched to obtain a color image during the day with a high image signal level (steps 404-407; see Exhibit B, page 8, lines 15-22), and the black-and-white filter is switched to obtain a black-and-white image at night with a low image signal level (steps 409-412; see Exhibit B, page 10, line 22 to page 11, line 3) (see also Exhibit B, page 5, lines 17-20; page 7, lines 9-11; page 7, lines 22-25; and page 8, lines 1-4).

6. Further, it is my belief that the whole invention set forth in claim 6, which depends from claim 5 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, my invention included a method of switching optical filters of a camera according to claim 5, as set forth in paragraph 5 above, and further wherein when the first optical filter is switched into the second optical filter or the second optical filter is switched into the first optical filter, outputting character information indicating the switching, from display means to a monitor (see Exhibit B, page 8, lines 20-22 and page 9, lines 1-9); and displaying the character information together with an image shot by the camera, on a screen of the monitor (see Exhibit B, page 11, lines 17-24).

7. Further, it is my belief that the whole invention set forth in claim 7, which depends from claim 6 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, my invention included a method of switching optical filters of a camera according to claim 6, as set forth in paragraph 6 above, and further wherein character information indicating that a black-and-white image is displayed on the screen of the monitor, when said image shot by the camera is automatically switched from a color image to a black-and-white image after detecting an image pick-up environment (see Exhibit B, page 11, lines 8-24).

8. Further, it is my belief that the whole invention set forth in claim 8 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, with reference to Figs. 1 and 3 as shown in Exhibit A (see English translation of labels on pages 17 and 18 of Exhibit B), my invention included a camera having:

a lens (101, 108, 301) provided on a camera body (106, 107) (see Exhibit B, page 4, lines 20-23; page 5, lines 3-6; and page 6, lines 20-24);

an image pick-up element (105, 303) for converting an image is provided by the lens (101, 108, 301) into an electrical image signal (see Exhibit B, page 4, lines 20-23; page 5, lines 4-6; and page 6, lines 20-24);

a first optical filter (115, 118);

a second optical filter (116, 117); and

optical filter switching mechanism (103, 104, 302, 304, 312) for selectively positioning one of the first optical filter (115, 118) and the second optical filter (116, 117) in front of the image pick-up element (105, 303) (see Exhibit B, page 4, line 24 to page 5, line 2; page 5, lines 10-25) based on a level of the image signal (see Exhibit B, page 10, lines 1-7 and lines 21-24).

9. Further, it is my belief that the whole invention set forth in claim 2, which depends from claim 8 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, my invention included a camera according to claim 8, as set forth in paragraph 8 above, and further wherein one of the first optical filter (115, 118) and the second optical filter (116, 117) is a color filter and the other is a black-and-white filter (see Exhibit B, page 5, lines 10-12), and wherein the color filter is switched to obtain a color image during the day with a high image signal level (steps 404-407; see Exhibit B, page 8, lines 15-22), and the black-and-white filter is switched to obtain a black-and-white image at night with a low image signal level (steps 409-412; see Exhibit B, page 10, line 22 to page 11, line 3) (see also Exhibit B, page 5, lines 17-20; page 7, lines 9-11; page 7, lines 22-25; and page 8, lines 1-4).

10. Further, it is my belief that the whole invention set forth in claim 3, which depends from claim 8 or 2 of the above-referenced U.S. patent application was in my possession at the time the draft specification was prepared. Specifically, my invention included a camera according to claim 8 or 2, as set forth in paragraphs 8 and 9 above, respectively, and further comprising detecting means (311) which detects a level of the image signal output (steps 402, 404, 409) from the image pick-up element (105, 303) (see Exhibit B, page 7, lines 21-22 and page 10, lines 1-3), wherein the first optical filter (115, 118) and the second optical filter (116, 117) are automatically switched depending on the signal level thus detected (see Exhibit B, page 10, lines 1-7 and lines 21-24).

11. On information and belief, on September 1, 1999, Japanese Patent Application No. 11-248048, which was based on the above-mentioned Draft Specification as shown in Exhibit A, was filed in the Japanese Patent Office. The above-referenced U.S. patent application, filed as an International Application on August 31, 2000 in the Japanese Patent Office, claims priority based on the Japanese Patent Application.

12. All statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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A

発明提案書(兼)特許出願依頼書

'99 年 6 月 28 日

事業部	依頼番号	種別		知的財産部受付印
AV 通AV 2983	11-4073	㊉:特許 0:公開技報 / その他 ( )		

B

発明者数	連絡者名(依頼書作成者)	所属	発明者が通工以外の会社社員のとき	発明の名称
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	フリガナ / 氏名	MAN-No.	通工外の会社名	貢献度
1	イコマ ケン / 生駒 賢	363109619		80%
2	タムラ カズシゲ / 田村 一成	3A121407		10%
3	タカクワ マコト / 高桑 誠	3921625		10%
4				%
5				%
6				%

関連する製品名(必ず記入すること): 第3世代複合カメラ
IPC(フルシンボル):
請求項数: 07 発明数: 07
品番: WU-CS650X(仮)
プロジェクトNo.: CA-012

本発明の実施予定 (1:実施する 2:検討中 3:実施しない 4:不明)										
実施予定(番号を記入)	1	1	1	1	1	1				
生産・発売地域(国の略号を記入)	JP	US	GB	AU	CH	FR				
発売開始予定日(年 月 日)	99年 12	年	年	年	年	年	年	年	年	年
発売開始予定日(年 月 日)	99年 12	年	年	年	年	年	年	年	年	年
企画台数	18万台	台	台	台	台	台	台	台	台	台
出願 予定有:3 後日検討:2		3	3	3	3	3				

(注) 国の略号
アメリカ:US アルゼンチン:AR イギリス:GB イスラエル:IL イタリア:IT インド:IN インドネシア:ID エジプト:EG オーストリア:AT オーストラリア:AU オランダ:NL カナダ:CA ギリシャ:GR シンガポール:SG スイス:CH スウェーデン:SE スペイン:ES タイ:TH 大韓民国:KR チェコスロバキア:CS デンマーク:DK トルコ:TR 台湾:TW 中国:CN ドイツ:DE 日本:JP ニュージーランド:NZ ノルウェー:NO ハンガリー:HU フィリピン:PH フランス:FR ブラジル:BR ブルガリア:BG ベルギー:BE 香港:HK ポーランド:PL ポルトガル:PT マレーシア:MY 南アフリカ:ZA メキシコ:MX ロシア:SU その他の国については国名を記載

共同出願:必要ありのときは「共同出願連絡確認書」を記入し添付してください。
☑1. 共同出願の必要なし
☐2. 共同出願の必要あり
☐3. わからない

キーワード(7文字以内):
1. フィルタ
2. 切替構造
3.
4.

フリーコード: 1 / 2 / 3

プロジェクト区分: ☐1.范囲会社 ☐2.R&Dプロ ☐3.将来特許 ☑4.その他 プロジェクト名

依頼のタイミング: ☐1.構想段階 ☑2.開発段階 ☐3.公表直前

発明・考案の公表日 平成 年 月 日
☐1.刊行物 ☐2.学会発表 ☐3.展示会 ☐4.サンプル提供 ☐5.共栄会社発注 ☐6.他社に提案・納入

出願を特に急ぐ場合その期限および理由 (期限) 平成 年 月 日 (理由)

C

発明・考案の要約 (50字以内で簡潔に記載): カメラ部内にある半導体撮像素子の前面に装置する光学フィルタを明るさにより切り替える構造

先行技術調査
必ず先行技術調査を行ない、本発明に最も近い先行技術文献(特許文献、その他の文献)を添付すること。
先行技術の特許番号または文献名の記載がないもの、または「なし」と記載しただけのものは受理されません。ご記入の上、再提出してください。

調査手段…………… ☑1.PATLIOT ☐2.PATOLIS ☐3.公開サマリー、又は公報 ☐4.その他
調査範囲(期間)…………西暦 1977 年 月 ~ 1999 年 (注:目安として出願前5年分くらいが適当と言われています)
調査結果(文献名)……… (特許文献は「番号」を記入) ① 出願 平8-289313 ② 出願 平4-203389 ③ 出願 平4-230248
☐5.知的財産部に調査依頼します(費用は事業部負担)。…………… 費用請求先コードNo.を記入して下さい。 コードNo.

D

評価欄

(記入上の注意)
各欄の該当する☐欄にレ印を入れ、評価マトリックスを目安にして総合評価(A,B,C,D)を記入して下さい。
(A, B ……出願する。C ……公開技報にする。D ……取り下げる。)

先行技術の状況: 同一の先行技術あり☐3 類似の先行技術あり☑2 類似の先行技術なし☐1

技術分類: ☐1.戦略発明出願 ☐2.権利使用 ☐3.防衛出願 ☐4.アイデア出願

発明の質と実施可能性の評価

(イ)侵比的実力(発明回避の困難度)	(ロ)予測される効果(解決課題の重要性)	(ハ)実施可能性(現在への実施の可能性)	(イ)+(ロ)+(ハ) 合計点数	無い 6☐	極低 5☐	低い 4☐	普通 3☐	高い 2☑	特別高 1☐
☑1.極めて大(6点)	☑1.極めて大(6点)	☑1.確定・予定(12点)	1. ☑ 22点~24点	C	B	B	B	A	A
☐2.大 (5点)	☐2.大 (5点)	☐2.可能性大 (10点)	2. ☐ 19点~21点	C	C	B	B	A	A
☐3.普通 (4点)	☐3.普通 (4点)	☐3.ある (8点)	3. ☐ 16点~18点	C	C	C	B	B	B
☐4.小 (3点)	☐4.小 (3点)	☐4.低い (6点)	4. ☐ 13点~15点	D	C	C	B	B	B
☐5.極めて小(1点)	☐5.極めて小(1点)	☐5.おそらく無い(2点)	5. ☐ 10点~12点	D	D	C	C	C	B
☐6.無い (0点)	☐6.無い (0点)	☐6.無い (0点)	6. ☐ 0点~9点	D	D	D	C	C	C

総合評価
(事)(研)の評価: A
知財部の評価:

備考:国内優先出願の場合の原出願番号等、その他の特記事項など

D1 D2

注) 外国出願依頼するときは、従来どおり外国出願専用の外国出願依頼書を別途提出してください。 松下通信工業株式会社 知的財産部

EXHIBIT A

【書類名】 明細書

【発明の名称】 光学フイルター切替構造と方法

【特許の請求範囲】

【請求項１】

半導体撮像素子を用いたカメラのﾚﾝｽﾞ、焦点機構を一体としたカメラ部であって、前記カメラ部の内部に装置している半導体撮像素子の前面にカラーあるいは白黒撮像用に最低一つ以上の光フイルターを装置し監視環境によりフイルターを切り替えて監視を行う構造の光学フイルター切替構造。

【請求項２】

半導体撮像素子を用いたカメラのﾚﾝｽﾞ、焦点機構を一体としたカメラ部であって、前記カメラ部の内部に装置している半導体撮像素子の前面にカラーあるいは白黒撮像用に最低一つ以上の光フイルターを装置し監視環境の明るさにフイルターを切り替える手段で監視を行う構造の光学フイルター切替構造の方法

【請求項３】

半導体撮像素子を用いたカメラのカメラ部内にある半導体撮像素子の前面に装置する光フイルターを、映像信号のレベルから、自動的にカラーから白黒に切りかえ、あるいは白黒からカラーに切替る構造として最適監視映像を再現できるようにした光学フイルター切替構造

【請求項４】

半導体撮像素子を用いたカメラのカメラ部内にある半導体撮像素子の前面に装置する光フイルターを、映像信号のレベルから、自動的にカラーから白黒に切りかえる手段で、撮像信号レベルにより最適監視映像を得るようにした光学フイルター切替の方法

【請求項５】

半導体撮像素子を用いたカメラのカメラ部内にある撮像素子の前面に装置する光フイルターを、映像信号のレベルから、自動的にカラーから白黒に切換え、あるいは白黒からカラーに切替えて最適映像を得る手段で、白黒画像に自動的に切り替えたときはモニターに白黒画像である表示をするようにした光フイルター切替の装置の方法

【請求項６】

半導体撮像素子を用いたカメラのカメラ部内にある半導体撮像素子の前面に装置する光フイルターを、映像信号のレベルから、自動的にカラーから白黒に切り換え、最適映像を得る手段で、カメラあるいはシステムに装置したセンサーにより撮像環境の明るさを検知して、カラー画像と白黒画像を自動的に切り替えたときはモニターに白黒画像である表示をするようにした光フイルター切替の装置

【請求項７】

半導体撮像素子を用いたカメラのカメラ部内にある半導体撮像素子の前面にカラーあるいは白黒撮像用に最低一つ以上の光フイルターを装置し監視状況によりフイルターを切り替えて監視を行う構造で、光フイルターをモーター駆動で切りかえる光フィルター切替構造

【発明の詳細な説明】

【発明の属する技術分野】

監視システムの画像は昼間、夜間を通じての画像の取得が条件であるので、カメラが明るさに対して非常に広い範囲に対するダイナミックレンジ特性が必要とされる。

監視領域での明るさの変化に対応にした監視映像に関するものである。

【従来の技術】

従来より知られているように半導体撮像素子は赤外領域の感度が通常の可視光レベルに比べはるかに高いので、半導体撮像素子を使用するときは赤外フイルターを撮像素子の前面に装置し、カラー映像を取得していた。

一般的に白黒撮像は赤外フイルターを装置しなくても白黒画像は再現できるが、カラー撮像カメラは赤外フイルターのが必要である。

【発明が解決しようとする課題】

しかしながら、監視カメラは昼間から夜間まで、監視画像を撮像しなければならないので、夜だから、昼だからと条件により撮像映像が取得できないと、監視の役目を果たさない。

そのためには、カメラの感度を落としたり上げたり、あるいはシャッター速度を変化させる等の手段があるり、そのほかの手段として半導体撮像素子特有の赤外領域での感度が向上する特性を生かした赤外フイルターによる監視カメラの性能を向上させることを目的として本発明を提供する。

【課題を解決するための手段】

本発明の具体例として使用条件が厳しく、安全確認のシステムとして近年ますます重要になってきている監視カメラを上げ説明する。

監視用カメラは監視用途により種々の構造があり、特に室内に装置して目だたない様に小型で高性能に作るために、ﾚﾝｽﾞ、焦点距離制御機能、撮像素子を一体としたカメラユニットに、光学フイルターを一体とした構造で実現した監視カメラのカメラ部のて具体例で説明する。

図１に示すカメラ部実施例１０６とカメラ部側面図１０７により説明する。撮像素子１０５に画像が焦点するようにﾚﾝｽﾞ１０１、と焦点制御１０２にて撮像素子１０５に撮像映像が焦点するように制御するように構成している。

撮像素子１０５の前部に光学フイルター収納部１０３を装置し、光フイルターをフイルター駆動ﾓｰﾀ１０４で、複数ある赤外フイルターの最適な赤外フイルターを撮像素子１０５の前面に位置するようにする。

カメラ部側面図１０７にて同様に説明すると、光１２２はﾚﾝｽﾞ１０８と焦点制御１０９により撮像素子１１３にて焦点するように構成され、前記撮像素子１１３の前部に光学フイルター１１１を装置し、複数の光学フイルター１１１にあるいずれかの光フイルターを選択するかの信号によりフイルター駆動ﾓｰﾀ１１２により光フイルターが選択される。

前記光学フイルター１１１の具体的な形状として白黒フイルター１１６とカラーフイルター１１５を同一の部品として、適当なる角度で構成し、共通部に回転ｷﾞﾔｰ１２０を用意する。

回転ｷﾞﾔｰ１２０はフイルター駆動ﾓｰﾀ１１２の軸に装置されたｷﾞﾔｰと噛み合い、フイルター駆動ﾓｰﾀ１１２が回転するとﾓｰﾀｷﾞﾔｰ１１９が光フイルターの位置を変化するように構成している。

カラーフイルター１１５が撮像素子１１３の前面に位置していたとして、カ

メラの撮像環境が夜間になりカメラの感度を上げるために白黒フイルター１１６に変更する指示が、自動的あるいは手動で指示でフイルター駆動モータ１１２が回転し回転ギヤー１２１により、光フイルターが動作し撮像素子１１３の前面に白黒フイルター１１７が位置するように、カメラの撮像条件に応じて可変できる構成としている。

【発明の実施の形態】

請求項１について説明する。

撮像素子の周波数特性は図２に示すように赤外領域で急激に光に対する感度が向上するため、カラー撮像時は赤外領域の感度が高いことによりカラー信号のＲＧＢのカラー信号を適切に分離できないので、赤外フイルターを撮像素子の前面に装置して赤外領域の感度を落としカラー信号が適切に分離するようにする。

一方白黒カメラでは、白黒の信号レベルが高ければ感度良く撮像できるため、カメラの性能に合わせた光学フイルターあるいは、フイルターなしでカメラを構成する。

一般的には監視カメラの用途に合わせ、適切な光フイルターを装置するのが一般であるが、白黒カメラでは無い場合もある。

以上のように撮像素子の赤外領域の感度を制御することで、カラー映像あるいは白黒映像を適切な感度で撮像できる。

そのための構造として、カメラ実施例１０６に示すように、レンズ１０１、映像の焦点制御１０２と一体とした光学系に撮像素子１０５を装置して小型で高性能な監視カメラの実現例で説明する。

光１２２がカメラ部のレンズ１０８に入力すると、目的とする映像の位置により映像を撮像素子１１３に焦点させるため、焦点制御回路により、焦点駆動モータ１１４が内部の光学部品の位置を動かして撮像素子１１３に映像を焦点させる。

通常のカラーカメラであれば、先に説明したようにカラー信号のＲＧＢ信号を適切に取り出すために固定的に撮像素子１１３の前面に赤外フイルターを装

置するが、　カラー撮像は夜間の監視時には、監視地点の明るさによるが、明るい状態に比べ映像が劣化する。
通常監視においては夜間であればカラー映像でなくても、白黒でも良い映像を監視映像として取り出だせれば、より良い監視が出きる。

以上のことから監視制御により焦点した映像が撮像素子１１３に入力する前部に光フイルター収納部１１０を用意し、前記収納部にカラーフイルター１１５と白黒フイルター１１６を装置した光フイルター１１１を装置する。

図３により制御の方法について説明すると、レンズ部３０１に入力した映像信号は撮像素子３０３により映像信号に変換され、映像増幅で適切の増幅され伝送出力として、さらに映像信号を増幅するための映像増幅３０７から映像信号情報を検知３１１にて、監視用途としての判断をし光フイルター駆動３０４を動かして、カラー映像でも十分に映像がよければカラー用のカラーフイルター１１５を撮像素子３０２の前に来るように光フイルター駆動３０４でモータを動かして固定する。

反対に、暗い状態で映像増幅３０７の画像が適切でないと検知３１１が判断すると光学フイルター駆動３０４にてモータを動かし撮像素子３０３の前に白黒フイルター１１７が位置するようにモータ３１２が回転して動かす。

撮像素子３０３には赤外領域の映像信号が入力するため、映像信号としてのＹ信号がレベルが飛躍的に上昇するため、白黒映像となるが、高いＳ／Ｎの映像信号を取り出すことができる。

以上のように撮像素子の前面に位置するフイルターの種類を可変することで、監視カメラの性能を向上させる。

請求項２について説明する。
請求項１の装置の動作手段を図４のフローチャート４０１から４１２を用いて説明する。
カメラ誤動作する初期の状態で撮像４０１で行い、撮像信号から、監視に十分な出力かどうか判断し、映像が十分 404 の状態であれば光フイルター駆動４０５は赤外フイルター４０６の位置するか、あるいは赤外フイルターに赤外

フイルター駆動で赤外フイルター４０６とする。

前記からカラー映像は監視映像としてカラー画像で出力４０７し監視センターのモニターに表示４０８監視映像がモニターされる。

画像の質の判断４０２で、画像レベルが不充分４０９と判断すると光フイルター駆動４１０により撮像素子の前面に白黒フイルターとする４１１として、白黒映像で十分な質の映像として、白黒映像を出力４１２し監視センターに伝送し監視センターのモニターの表示４０８にて監視映像がモニターされる。

監視センターの管理人あるは、自動的に画質を判断する装置があり、監視センタに送られた画質がカラーでは十分でないと判断して、光フイルターの指示を、センター装置からの指示４０３として入力し、監視映像カラーか白黒映像かの選択ができるようにする。

以上のように、カメラ内のループあるいは監視センターからの監視映像による何れかの判断により光フイルターの切替で映像の質を制御する方法。

請求項３につて説明する。

監視システムは通常２４時間の連続監視を行うことが通常である。

２４時間の動作の条件として、監視カメラは昼間の明るい映像から、夜間の暗い映像までを質の良い映像を監視センターに伝送することが必要である。

監視センターで画質を確認しながら、監視システムのカメラ個々に指示を与えることも可能であるが、大規模な監視システムになると、１０００台に及ぶ監視カメラを装置しているので、そのすべてのカメラにマニュアルで指示を出すの不可能と言てよい。

そこで、それらの判断をカメラ自身にさせることができればシステム全の操作が楽になり監視業務に専念できる。

映像増幅３０７からの映像信号から検知３１１が自動的に映像の質の判断を白レベルあついは黒レベルから判断して、映像として暗い映像の信号である一方に偏った信号であると検知３１１判断したら、光フイルター駆動３０４にてモーター３１２を動作させ、撮像素子１１３の前面の光フイルター１１１内のフイルターをカラーフイルター１１５から白黒フイルター１１７に回転して切

りかえる。

白黒フイルターにより、赤外領域の感度が高いところに映像の光が入力することで、映像信号のＹ信号が十分となり、コントラストの明快な映像を得ることができる。

以上のようにセンターからの指示によらずとも、ローカルで映像の判断をして最適な監視映像を監視センターの送る方式である。

請求項４について説明する。
請求項３のローカルすなわちカメラ自身での映像の判断による光フイルターの説明に加える。

すなわち、映像の質の判断をカメラ自身で映像の質の判断４０２を行う。

前記の映像の判断はＹ信号レベル、映像メモリーによる映像比較により行われ、映像レベルが不充分４０９と判断すると光フイルター４１０を白黒用の光フイルターに切り替えることで、赤外信号が撮像素子に入力し、撮像素子が赤外信号により十分なＹ信号を出力し、取得映像が白黒映像を出力４１２し、監視センターのモニター４０８に表示する。

以上のように、カメラ自身に映像の質の判断させ、最適な映像をセンターに送る方式である。

請求項５について説明する。
監視環境により自動的に光フイルターを切り替えて、高画質の白黒映像を監視センターに送る装置と方法について説明したが、監視センター側にてはカラー映像から突然と白黒映像に切り替わたことで、カメラあるいはシステムの一部が故障したたのではないかと誤った判断をする危険もある。

以上のことを考慮して、検知３１１が白黒画像に切りかえると判断した時に、判断した信号を表示３０８に出力する。

表示３０８は、文字情報がメモリーされていて、検知３１１より切り替えた信号を受けると、たとえば“現在は白黒画像です”と言うようなメッセージを映像増幅３０７に送り、送出映像に合成した映像として監視センターに送り、

モニターに現在の受信映像は白黒映像に切り替わったこと、あるいは白黒映像が送られていることを表示し、監視センターのモニターにカラー映像から白黒映像に切り替わったことが正常に行われていることを表示する。

前記のように切り替わったことを表示することで、システムや装置の異常では無く、監視領域の撮像条件に変化が生じたことの条件の変更の表示で、監視センターの管理者も撮像モードの変更に対してシステムげ正常に動作していることが確認できる。

また、表示３０８内にタイマーを用意し、白黒映像伝送時は定期的にあるいは常に表示を送り、監視センターのモニター表示することも本発明に含まれる。

以上の動作を図４の動作フローで説明すると、画像の質の判断４０２にで判断されて信号は文字表示出力指示４１３になされて、文字表示信号が出力されて文字表示を出力
４１４が白黒画像を出力４１２に合成されて監視センターのモニターに表示４０８にされる。

文字表には白黒画像に切り替わった後、白黒画像であることを表示し、その後一定時間後とに、あるいは常時表示されることも含まれる。

請求項６について説明する

監視カメラの映像にて、監視環境の判断をするときに、環境が暗いにもかかわらず、映像範囲内に白い花が咲いたり、白い靴が置かれたり、街灯の光があったりして、映像信号から監視環境の判断が難しい環境では、誤動作を行うことがあるので、カメラまたシステムに環境の条件を感知するセンサー３０５を用意し、環境内の条件を正確に判断した信号を検知３１１に入力し、光フイルターの動作を的確に行うことで、前記したような監視環境内の季節的変化や設備の変更に伴うことからの誤動作を防ぐことができる。

請求項７について説明する。

撮像素子の感度によっては本具体例による２つの光フイルターではなく、３つの光フイルターを装置することもある。

それぞれのフイルターを適切に撮像素子１１Ｓの位置に正確に位置するためには正確な位置制御が必要で、機械的に位置を制御したときに、経時変化で撮像素子の位置に正確に位置しないような誤差が発生した時に監視カメラをはずして修理するようなハード的な対応が必要である。

しかし本発明のように光フイルターの位置の変更をモーターで動かす構成とすれば、モーター駆動の光フイルター駆動３０４内に位置メモリーを装置しておき、撮像素子３０３の前面に光フイルター３０２が適切に位置しない場合センターからの指示で前記位置メモリーを微調整して、遠隔動作にて制御できる。

もちろん本発明の説明に用いられている２つのフイルターの場合でも位置合わせ、可変のスピードの変更もできる優れた効果が発揮できる。

【発明の効果】

監視システムはカメラの監視領域内の映像を明確に撮像し、監視センターに送ることがシステムの使命である。

夜間は監視業務として重要な時間であるので、カラー撮像で監視できることが理想であるが、夜間は色が少ないこともあり、白黒映像でも映像の質が高いことが望まれることがおおくある。

以上のように監視システムとして、映像を的確に撮像する役目をする方法として効果がある。

【図面の簡単な説明】

【図１】カメラ部

光フイルター装置したカメラの実施例の説明図

【図２】撮像素子周波数特性

半導体撮像素子の周波数特性とフイルターの特性の説明図

【図３】系統図

フイルターの切替をする系統図の説明

【符号の説明】

１０１．レンズ

１０２．焦点制御

１０３．光フイルター収納部
１０４．フイルター駆動モーター
１０５．撮像素子
１０６．カメラ部実施例
１０７．カメラ部側面図
１０８．レンズ
１０９．焦点制御
１１０．光フイルター収納部
１１１．光フイルター
１１２．フイルター駆動モータ
１１３．撮像素子
１１４．焦点駆動モータ
１１５．カラーフイルター
１１６．白黒フイルター
１１７．白黒フイルター
１１８．カラーフイルター
１１９．モーターギヤー
１２０．回転ギヤー
１２１．回転ギヤー
１２２．光
１２３．焦点駆動モーター
１２４．モーターギヤー

３０１．レンズ部
３０２．光フィルター
３０３．撮像素子
３０４．光フイルター駆動
３０５．センサー
３０６．映像増幅

３０７．映像増幅

３０８．表示

３０９．伝送Ｉ／Ｆ

３１０．映像出力

３１１．検知

３１２．モータ

４０１．－４１４．　フローチャート

【書類名】　要約書

【要約】

【課題】

監視システムにて、２４時間連続監視を行う時、あるいはカメラを使用する環境の変化に対応して良質な映像を監視者に提供する課題。

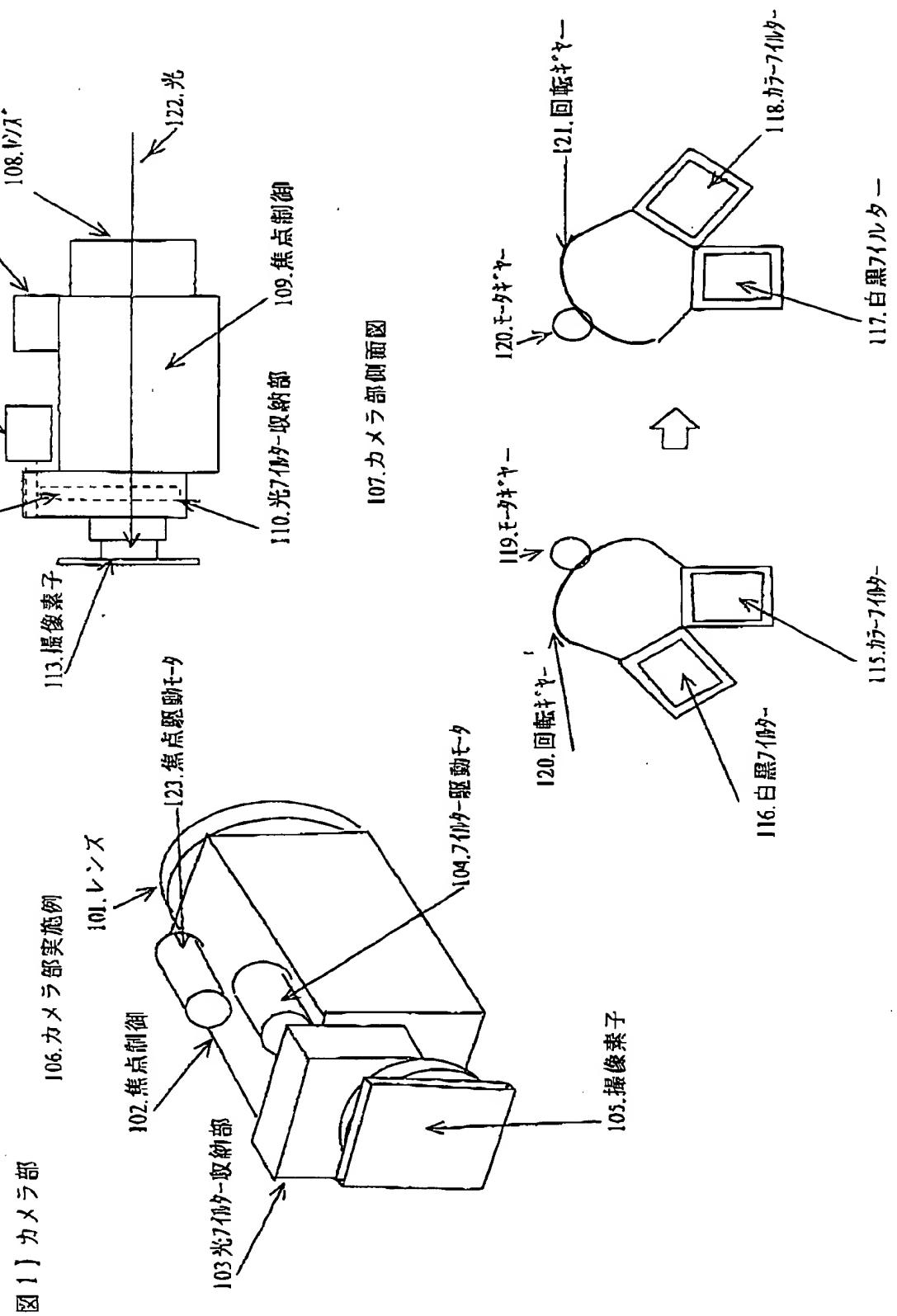
【解決手段】

半導体撮像素子が持っている、光に対する感度の制御を光学的に行えることに着目し、半導体撮像素子に光フィルターを用いて最適映像を得る解決手段。

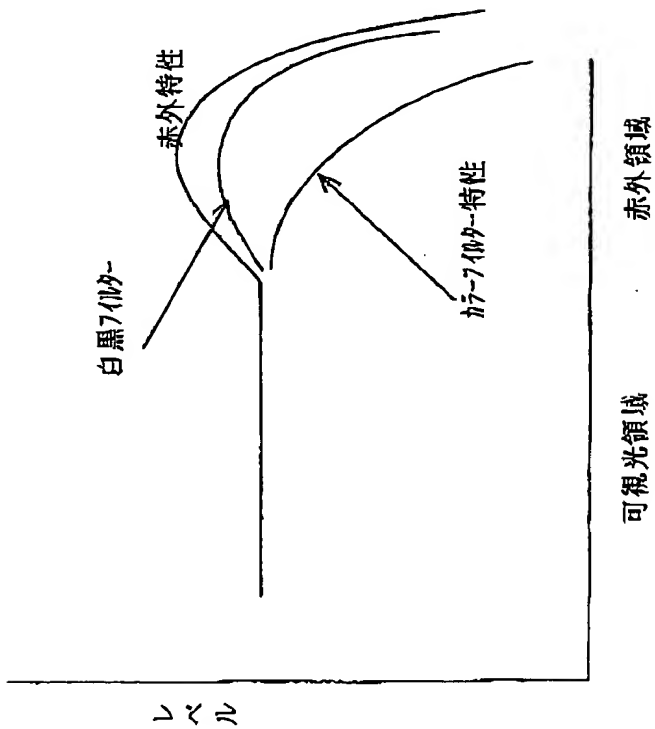
【選択図】

図１

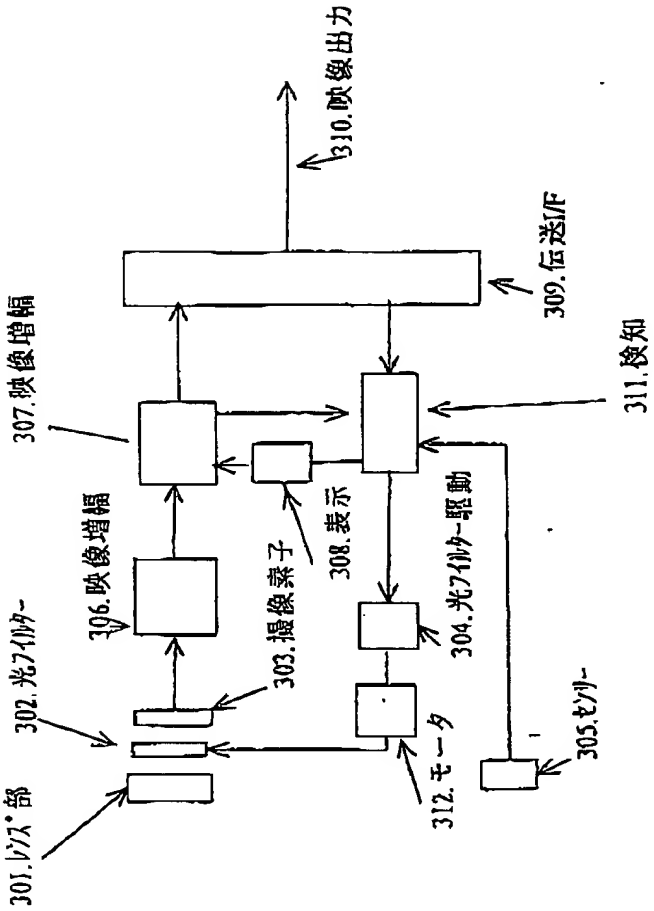
【図１】カメラ部


106.カメラ部実施例
101.レンズ
123.焦点駆動モータ
104.フィルター駆動モータ
102.焦点制御
103.光フィルター収納部
105.撮像素子
107.カメラ部側面図
108.ビス
114.焦点駆動モータ
122.光
112.フィルター駆動モータ
109.焦点制御
111.光フィルター
110.光フィルター収納部
113.撮像素子
120.モータギヤー
121.回転ギヤー
118.カラーフィルター
117.白黒フィルター
119.モータギヤー
120.回転ギヤー
115.カラーフィルター
116.白黒フィルター

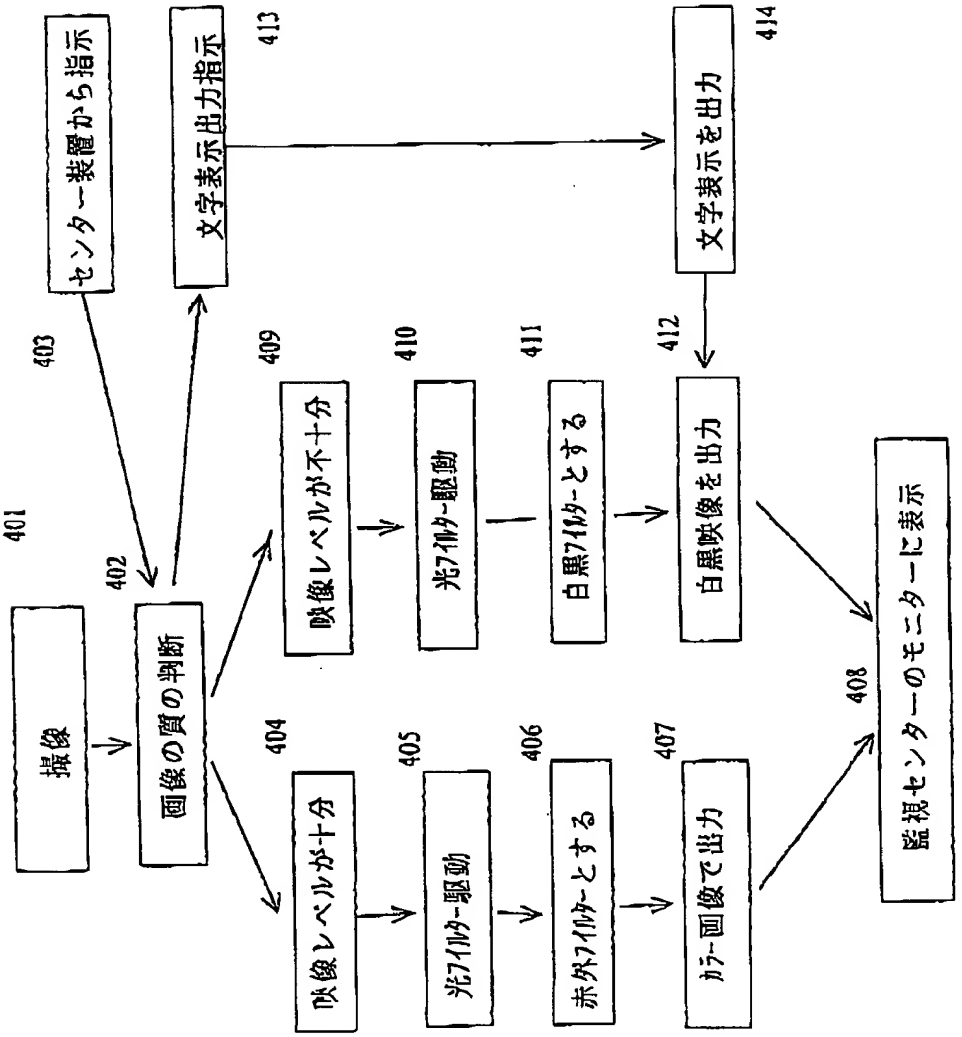
【図２】撮像素子周波数特性



【図３】系統図



【図４】動作フロー


401
撮像
402
画像の質の判断
403
センター装置から指示
404
映像レベルが十分
405
光フィルター駆動
406
赤外フィルターとする
407
カラー画像で出力
408
監視センターのモニターに表示
409
映像レベルが不十分
410
光フィルター駆動
411
白黒フィルターとする
412
白黒映像を出力
413
文字表示出力指示
414
文字表示を出力

A

The proposal of invention and request for patent application

June 28, '99

Division	Request No.	Type	P:Patent	O:Public technique	Intellectual property right			Intellectual property
AV	H11-4073		Other	report	Chairman	Person in charge	Immediate Manager	department
					Takahashi	Sato	Tanaka	receipt stamp

EXHIBIT B

Number of inventor Three	Interface (a person forming this request) Ken IKOMA Extension:6698	Affiliation	security S departmen Imaging S3 section	Write in campany name if the inventor is not belonged to Matsushita Communication industrial Co.,Ltd Campany name other than Matsuhita Communication industrial Co., Ltd	Title of invention Configuraiton of switching optical filters and method thereof

Inventor		Contribution	Related product	Number of claims	Number of invention
	1:Ken IKOMA	80%	A Complex camera in 3rd generation	7	7
	2:Kazushige TAMURA	10%	Part number	Project No.	
	3: Makoto TAKAKUWA	10%	WV-CS650X(provisional)	CA-012	

Schedule of invention 1:implement 2: during consideration 3: non-implement 4: suspense					
Schedule (write in number)	1	1	1	1	1
Area of production and sale	JP	US	GB	CH	FR
Schedule of starting sale	Dec. 1999	/ Year	/ Year	/ Year	/ Year
Schedule of starting mass productio	Dec. 1999	/ Year	/ Year	/ Year	/ Year
Number of product in plan	180000				
Filing application 3:Planning	/	3	3	3	3
Filing application 2:Considering later					

Please attach "Confirmation of joint application when the joint application is needed 1. No-need to file the joint application 2. Need to file the joint application 3. Unknown	Key word	1.Filter 2. Switching configuration

Free code	Classification of project 1.Matsushita Electric Industrial Co., Ltd 2. R&D project 3. Aftertime patent 4. Other Name of Project	Timing of request 1. Conceptual phase 2. Development phase 3. Prepublication	Publication date of invention Heisei Year Month Day 1. Publication 2. Presentation in academic conference 3. Exhibition 4. Providing of sample 5. Order to co-prosperity company 6. Proposing or deliverying to other companies	Time and reason if you rush to file the application (time) Hei. Year Month Day (reason)

Number of inventor Three	Interface (a person forming this request) Ken IKOMA Extension:6698	Affiliation	security S departmen Imaging S3 section	Write in campany name if the inventor is not belonged to Matsushita Communication industrial Co.,Ltd Campany name other than Matsuhita Communication industrial Co., Ltd	Title of invention Configuraiton of switching optical filters and method thereof

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Area of production and sale	JP	US	GB	CH	FR
Schedule of starting sale	Dec. 1999	/ Year	/ Year	/ Year	/ Year
Schedule of starting mass productio	Dec. 1999	/ Year	/ Year	/ Year	/ Year
Number of product in plan	180000				
Filing application 3:Planning	/	3	3	3	3
Filing application 2:Considering later					

Please attach "Confirmation of joint application when the joint application is needed 1. No-need to file the joint application 2. Need to file the joint application 3. Unknown	Key word	1.Filter 2. Switching configuration

Free code	Classification of project 1.Matsushita Electric Industrial Co., Ltd 2. R&D project 3. Aftertime patent 4. Other Name of Project	Timing of request 1. Conceptual phase 2. Development phase 3. Prepublication	Publication date of invention Heisei Year Month Day 1. Publication 2. Presentation in academic conference 3. Exhibition 4. Providing of sample 5. Order to co-prosperity company 6. Proposing or deliverying to other companies	Time and reason if you rush to file the application (time) Hei. Year Month Day (reason)

Abstract of invention (describe the content simply in 50 words)	A configuration to switch an optical filters provided on a front face of semiconductor capturing element in a camera portion in accordance with the lightness.

Presearch of technique	Please make sure to perform pre-technical search and attach a most related publication (patent publication, other publication) If a patent number or name of the publication is not described or only "none" is described, the request can not be received. So, please describe the number or name of the publication and resubmit it. Method of searching 1. PATLIOT 2. PATOLIS 3. Public samary or Publication 4. Other 5. Requesting the search to Intellectual property department (cost is charged to division) Term of search From 1979 to 1999 (Notice: search term is appropriately five years from the timing of filing the application) Result of the search (Name of publication) (write [number] if the publication is patent publication) 1. JP-8-289313 | 2. JP-4-203389 | 3. JP-4-2302048

Rating field	(Notice on writing) Please enter a check mark in a box corresponding to each field and write a total account based on a normal matrix. (A,B…Filing an application, C… Submiting as public technical report, D… Withdrawn)	Status of prior art		
		3. Prior art same as the invention exists	2. Prior art similar to theinvention exists	1. Prior art similar to the invention is none

Positioning
1.Filing an application for strategically
2. Use in positive
3. Filng an application for protection
4. Filing an application for idea

01

Rating field	Rating of Quality of the invention and possibility of conduction					
	I) Binding force to other company (difficulty of aboiding theinvention)		II)Projected effect (importance of solution of problem		III)Possibility of conduction (possibility of conducting a product)	
	1.Tremendous	(6 points)	1.Tremendous	(6 points)	1.Fixedness, schedule	(12 points)
	2.Large	(5 points)	2.Large	(5 points)	2.Large possibility	(10 points)
	3.Normal	(4 points)	3.Normal	(4 points)	3.Certain	(8 points)
	4.Small	(3 points)	4.Small	(3 points)	4.Low	(6 points)
	5.Minute	(2 points)	5.Minute	(2 points)	5.Probably none	(2 points)
	6.None	(1 points)	6.None	(1 points)	6.None	(0 points)
Remarks: Basic application number in a case of the domestic priority application, other remarks						

02

Rating field		Possibility of grant a patent (comparing the prior art)						Total account (Division),(Reseach) A (Intellectual property department)
	Total points of I)+II)+III)	6.None	5. Minute	4.Low	3.Normal	2.High	1. Tremendous	
	1. 22points-24points	C	B	B	B	A	A	
	2. 19points-21points	C	C	B	B	A	A	
	3. 16points-18points	C	C	C	B	B	B	
	4. 13points-15points	D	C	C	B	B	B	
	5. 00points-12points	D	D	C	C	C	D	
	6. 0point-9points	D	D	D	C	C	C	

[Designation of Document] Specification

[Title of the Invention] Optical Filter Switching Structure and Method

[Claims]

[Claim 1]

An optical filter switching structure wherein in a camera portion having a lens and a focusing mechanism provided integrally in a camera using a semiconductor image pick-up unit, at least one optical filter for a color or black-and-white image pick-up is provided on a front face of the semiconductor image pick-up unit disposed in the camera portion and is switched depending on a monitoring environment, thereby carrying out monitoring.

[Claim 2]

A method of an optical filter switching structure wherein in a camera portion having a lens and a focusing mechanism provided integrally in a camera using a semiconductor image pick-up unit, monitoring is carried out by means having at least one optical filter for a color or black-and-white image pick-up provided on a front face of the semiconductor image pick-up unit disposed in the camera portion and serving to switch the filter depending on a brightness in a monitoring environment.

[Claim 3]

An optical filter switching structure wherein an optical filter provided on a front face of a semiconductor image pick—up unit disposed in a camera portion of a camera using a semiconductor image pick-up unit can be constituted to automatically carry out switching from color to black-and-white or from black-and-white to color based on a level of an image signal, thereby reproducing an optimum monitor image.

[Claim 4]

A method of switching an optical filter wherein an optimum monitor image is obtained based on a level of an image pick-up signal by means for automatically switching an optical filter provided on a front face of a semiconductor image pick-up unit in a camera portion of a camera using the semiconductor image pick-up unit from color to black-and-white based on a level of an image signal.

[Claim 5]

A method of an optical filter switching apparatus wherein a display indicative of a black-and-white image is carried out over a monitor when switching to the black-and-white image is automatically performed by means for automatically switching an optical filter provided on a front face of an image pick-up unit in a camera portion of a camera using a semiconductor image pick-up unit from color to black-and-white or from black-and-white to color based on a level of an image signal, thereby obtaining an optimum image.

[Claim 6]

An optical filter switching apparatus for detecting a brightness in an image pick-up environment by a sensor provided in a camera or a system and carrying out a display indicative of a black-and-white image over a monitor when a color image and the black-and-white image are automatically switched by means for automatically switching an optical filter provided on a front face of a semiconductor image pick-up unit in a camera portion of a camera using the semiconductor image pick-up unit from color to black-and-white based on a level of an image signal, thereby obtaining an optimum image.

[Claim 7]

An optical filter switching structure in which at least one optical filter is provided for a color or black-and-white image pick-up on a front face of a semiconductor image pick-up unit disposed in a camera portion of a camera using the semiconductor image pick-up unit and is switched depending on a monitoring situation to carry out monitoring, wherein the optical filter is switched by driving a motor.

[Detailed Description of the Invention]

[Technical Field to which the Invention Belongs]

An image of a monitoring system is subject to be acquired during the day and night. For this reason, a camera is required to have a dynamic range characteristic within a very wide range for a brightness.

The present invention relates to a monitor image corresponding to a change in the brightness in a monitor region.

[Prior Art]

As is conventionally known, a semiconductor image pick-up unit has a sensitivity in an infrared region which is much higher than an ordinary visible light level. When the semiconductor image pick-up unit is to be used, therefore, an infrared filter is provided on the front face of the image pick-up unit to acquire a color image.

Referring to a black-and-white image pick-up, generally, a black-and-white image can be reproduced even if the infrared filter is not provided. However, a color image pick-up camera requires the infrared filter.

[Problems that the Invention is to Solve]

However, a monitoring camera is to pick up a monitor image from day to night. If a pick-up image cannot be acquired depending on the night or the day,

therefore, the monitor camera does not play a part in monitoring.

For this purpose, there is means for reducing or increasing the sensitivity of the camera or changing a shutter speed. For another means, it is an object of the invention to enhance the performance of a monitoring camera through an infrared filter making the best of a characteristic to improve a sensitivity in an infrared region which is peculiar to a semiconductor image pick-up unit.

[Means for Solving the Problems]

As a specific example of the invention, description will be given to a monitoring camera which has the tough conditions of use and has been increasingly important as a safety confirming system in recent years.

The monitoring camera has various structures depending on the uses for monitoring. In particular, description will be given to a specific example of a camera portion in a monitoring camera implemented by a structure in which an optical filter is integrated with a camera unit having a lens, a focal length control function and an image pick-up unit provided integrally in order to fabricate the monitoring camera having a small size and a high performance so as to be provided inconspicuously in a room.

Referring to a camera portion example 106 and a camera portion side view 107 shown in Fig. 1, description will be given. In order to focus an image on an image pick-up unit 105, a control is carried out in such a manner that a pick-up image is focused on the image pick-up unit 105 through a lens 101 and a focal control 102.

An optical filter housing portion 103 is provided on the front part of the image pick-up unit 105, and an optimum one of infrared filters is positioned on

the front face of the image pick-up unit 105 by means of a filter driving motor 104.

Referring to the camera portion side view 107, description will be given in the same manner. There is employed a structure in which a light 122 is focused on an image pick-up unit 113 through a lens 108 and a focal control 109. Optical filters 111 are provided on the front part of the image pick-up unit 113 and any of the optical filters 111 is selected by means of a filter driving motor 112 in response to a signal indicative of the selection of any of the optical filters 111.

As a specific shape of the optical filter 111, a black-and-white filter 116 and a color filter 115 are constituted at proper angles as identical components, and a rotating gear 120 is prepared in a common portion.

There is employed a structure in which the rotating gear 120 is mated with a gear provided on the shaft of the filter driving motor 112, and a motor gear 119 changes the position of the optical filter when the filter driving motor 112 is rotated.

There is employed a structure in which an instruction for carrying out a change to the black-and-white filter 116 in order to increase the sensitivity of the camera in the image pick-up environment of the camera at night can be varied automatically or manually depending on the image pick-up conditions of the camera in such a manner that the filter driving motor 112 is rotated and the optical filter is operated by means of the rotating gear 120 so that the black-and-white filter 116 is positioned on the front face of the image pick-up unit 113 on the assumption that the color filter 115 is positioned on the front face of the image pick-up unit 113.

[Embodiment of the Invention]

Claim 1 will be described.

For the frequency characteristic of an image pick-up unit, a sensitivity to a light is suddenly enhanced in an infrared region as shown in Fig. 2. Therefore, the sensitivity in the infrared region is high during a color image pick-up so that color signals of RGB cannot be separated properly. For this reason, an infrared filter is provided on the front face of the image pick-up unit to reduce the sensitivity in the infrared region, thereby separating the color signals properly.

On the other hand, in a black-and-white camera, an image can be picked up with a high sensitivity if a black-and-white signal level is high. Therefore, the camera is constituted with an optical filter adapted to the performance of the camera or without the filter.

In general, a proper optical filter is provided in accordance with the uses of a monitoring camera. In some cases, the black-and-white camera is not provided.

By controlling the sensitivity in the infrared region of the image pick-up unit as described above, it is possible to pick up a color image or a black-and-white image with a proper sensitivity.

A structure for this purpose will be described in an example of the implementation of a monitoring camera having a small size and a high performance in which the image pick-up unit 105 is provided in the optical system having the lens 101 and the image focal control 102 integrally as shown in the camera portion example 106.

When the light 122 is input to the lens 108 of the camera portion, a focal

driving motor 114 moves the position of the optical component provided on an inside by means of a focal control circuit, thereby focusing an image on the image pick-up unit 113 depending on the position of the image to be intended.

In an ordinary color camera, the infrared filter is fixedly provided on the front face of the image pick-up unit 113 in order to properly fetch the color RGB signals as described above. Referring to a color image pick-up in monitoring at night, an image is more deteriorated than that in a bright state depending on a brightness at a monitoring point.

In normal monitoring, if a black-and-white image can be taken out as a monitor image in place of the color image at night, the monitoring can be carried out better.

From the foregoing, an optical filter housing portion 110 is prepared in the front part through which the image focused by the monitoring control is input to the image pick-up unit 113 and the optical filter 111 provided with the color filter 115 and the black-and-white filter 116 is disposed in the housing portion 110.

A control method will be described with reference to Fig. 3. An image signal input to a lens portion 301 is converted into an image signal by an image pick-up unit 303 and is transmitted as an output which is properly amplified by an image amplification, and furthermore, image signal information is transmitted from an image amplifier 307 for amplifying the image signal and is decided for monitoring uses in a detector 311, and an optical filter drive 304 is operated. If a color image is sufficiently excellent, the motor is driven by the optical filter drive 304 to carry out a fixation in such a manner that the color filter 115 comes to the front of an image pick-up unit 302.

To the contrary, if the detector 311 decides that the image of the image amplifier 307 is not proper in a dark condition, the motor is operated by the optical filter drive 304 so that a motor 312 is rotated to move a black-and-white filter 117 to be positioned before the image pick-up unit 303.

The image signal in the infrared region is input to the image pick-up unit 303. Therefore, the level of a Y signal to be the image signal is dramatically raised. Consequently, it is possible to fetch an image signal having a high S/N which gives a black-and-white image.

By varying the type of the filter to be positioned on the front face of the image pick-up unit as described above, it is possible to enhance the performance of a monitoring camera.

Claim 2 will be described.

The operating means in the apparatus according to claim 1 will be described with reference to flowcharts 401 to 412 in Fig. 4.

An image pick-up is carried out in an initial condition in which the camera malfunctions at 401, and it is decided whether an image pick-up signal is a sufficient output for monitoring or not. If the image is sufficient at 404, the optical filter is driven at 405 in the position of the infrared filter or the infrared filter is set through the operation of the infrared filter at 406.

From the foregoing, a color image is output as a monitor image at 407 and is displayed on a monitor in a monitoring center at 408 so that the monitor image is monitored.

If it is decided that the image level is insufficient at 409 by the decision of the quality of the image at 402, the optical filter is driven at 410 and a black-and-white filter is set on the front face of the image pick-up unit at 411.

Thus, a black-and-white image is output as an image of sufficient quality at 412 and is transmitted to the monitoring center, and the monitor image is monitored on the display of the monitor in the monitoring center at 408.

In the monitoring center, an administrator is present or an apparatus for automatically deciding picture quality is provided. It is decided that the picture quality of a color image transmitted to the monitoring center is not sufficient and the instruction of the optical filter is input as an instruction from the center apparatus at 403. Thus, it is possible to select a color or black-and-white monitor image.

As described above, there is provided the method of controlling the quality of an image by switching the optical filter based on the decision of the monitor image transmitted from a loop in the camera or the monitoring center.

Claim 3 will be described.

A monitoring system usually carries out continuous monitoring for 24 hours.

For the conditions of the operation for 24 hours, the monitoring camera is to transmit, to a monitoring center, images of high quality including a bright image during the day and a dark image at night.

It is also possible to give an instruction to each of the cameras in the monitoring system while confirming picture quality in the monitoring center. However, a large-scaled monitoring system is provided with one thousand monitoring cameras. For this reason, it is impossible to manually give an instruction to all of the cameras.

If the camera itself can be caused to carry out the decision, therefore, the whole system can easily be operated to concentrate on the monitoring work.

The detector 311 automatically decides from the image signal sent from the image amplifier 307 whether the quality of an image is a white level or a black level. If the detector 311 decides that the same signal is a biased signal to be a dark image signal, the motor 312 is operated by the optical filter drive 304, thereby switching the filter in the optical filter 111 provided on the front face of the image pick-up unit 113 from the color filter 115 to the black-and-white filter 117 through a rotation.

By the black-and-white filter, the light of an image is input to a portion in an infrared region which has a high sensitivity. Consequently, a Y signal for the image signal can be sufficient and an image having a high contrast can be obtained.

As described above, in this system, an image is decided locally and an optimum monitor image is transmitted to the monitoring center irrespective of an instruction given from the center.

Claim 4 will be described.

There will be additionally described the optical filter based on the decision of an image which is to be made locally, that is, by means of the camera itself according to claim 3.

More specifically, the quality of an image is decided by means of the camera itself at 402.

The decision of the image is carried out based on a Y signal level and the comparison of the image through an image memory. If it is decided that the image level is insufficient at 409, the optical filter is switched to the black-and-white optical filter at 410. Consequently, an infrared signal is input to the image pick-up unit and the image pick-up unit outputs a sufficient Y signal

in response to the infrared signal, and a black-and-white image is output as the acquired image at 412 and is displayed on the monitor in the monitoring center at 408.

As described above, in this system, the camera itself is caused to decide the quality of an image and an optimum image is transmitted to the center.

Claim 5 will be described.

While the description has been given to the apparatus and method for automatically switching the optical filter depending on a monitoring environment and transmitting a black-and-white image of high picture quality to the monitoring center, there is also a danger that it might be decided erroneously that a part of a camera or a system breaks down by sudden switching from a color image to a black-and-white image on the monitoring center side.

In consideration of the foregoing, when the detector 311 decides to carry out the switching to the black-and-white image, a signal indicative of the decision is output to a display 308.

The display 308 stores character information and sends the image amplifier 307 a message of "a black-and-white image is being given", for example, upon receipt of a signal indicative of the switching from the detector 311, and transmits, to the monitoring center, an image synthesized into an image to be transmitted and displays, on a monitor, that a current received image is switched to the black-and-white image or the black-and-white image is being transmitted and displays, on the monitor in the monitoring center, that the color image is normally switched to the black-and-white image.

By the display of the switching described above, an administrator in the

monitoring center can also confirm that the system is normally operated for a change in an image pick-up mode by the display of a variation in conditions that the image pick-up conditions in the monitoring region are changed in place of the abnormality of the system or the apparatus.

Moreover, the invention also includes that a timer is prepared in the display 308 and the display is periodically or always sent in the transmission of a black-and-white image and is executed over the monitor in the monitoring center.

The above operation will be described with reference to the operation flow in Fig. 4. The quality of an image is decided at 402 and an instruction for outputting a character display is given at 413, and a character display signal is output at 414, and a black-and-white image is synthesized into the output at 412 and the display is carried out over the monitor in the monitoring center at 408.

After the switching to the black-and-white image is carried out, the display of the black-and-white image is performed over a character table. Then, the display is carried out after a constant time or all the time.

Claim 6 will be described.

In some cases in which a monitoring environment is to be decided based on the image of a monitoring camera, a malfunction is carried out in an environment in which the monitoring environment is hard to decide from an image signal, for example, white flowers come out within an image range, white shoes are put or a light is emitted from a streetlamp irrespective of a dark environment. For this reason, a sensor 305 for sensing the conditions of the environment is prepared for the camera or the system, and a signal indicative of the accurate decision of the conditions in the environment is input to the

detector 311 and the operation of the optical filter is carried out precisely. Consequently, it is possible to prevent the malfunction from being caused by a seasonal variation or a change in equipment in the monitoring environment described above.

Claim 7 will be described.

In some cases, three optical filters are provided in place of the two optical filters according to the specific example depending on the sensitivity of an image pick-up unit.

In order to accurately position the respective filters in the image pick-up unit 113, it is necessary to accurately control the position. It is necessary to take measures on a hardware basis, for example, to remove and repair the monitoring camera in the generation of such an error that the filters are not placed in the position of the image pick-up unit due to aging when the position is mechanically controlled.

With the structure in which the position of the optical filter is changed by means of the motor as in the invention, however, in the case in which a position memory is provided in the optical filter drive 304 for driving the motor and the optical filter 302 is not properly positioned on the front face of the image pick-up unit 303, it is possible to finely regulate the position memory in accordance with an instruction sent from the center, thereby carrying out a remote control.

As a matter of course, it is possible to produce excellent advantages that an alignment and a variation in a speed can be carried out also in case of the two filters used in the description of the invention.

[Advantage of the Invention]

A monitoring system has a mission to clearly pick up an image within

the monitoring region of a camera and to transmit the image to a monitoring center.

The night is important for a monitoring work. Therefore, it is ideal that monitoring can be carried out through a color image pick-up. However, the night has very few colors. In many cases, therefore, it is desired that a black-and-white image should have high quality.

As described above, it is possible to produce advantages that the monitoring system functions to precisely pick up an image.

[Brief Description of the Drawings]

Fig. 1 is an explanatory view showing an example of a camera provided with an optical filter,

Fig. 2 is a chart for explaining the frequency characteristic of a semiconductor image pick-up unit and the characteristic of a filter, and

Fig. 3 is a diagram for explaining a system for switching the filter.

[Description of the Reference Numerals and Signs]

101 lens
102 focal control
103 optical filter housing portion
104 filter driving motor
105 image pick-up unit
106 camera portion example
107 camera portion side view
108 lens
109 focal control
110 optical filter housing portion

111 optical filter
112 filter driving motor
113 image pick-up unit
114 focal driving motor
115 color filter
116 black-and-white filter
117 black-and-white filter
118 color filter
119 motor gear
120 rotating gear
121 rotating gear
122 light
123 focal driving motor
124 motor gear
301 lens portion
302 optical filter
303 image pick-up unit
304 optical filter drive
305 sensor
306 image amplifier
307 image amplifier
308 display
309 transmission I/F
310 image output
311 detector

312 motor

401 – 414 flowchart

[Designation of Document] Abstract

[Abstract]

[Problem] It is an object to provide an image of high quality to an administrator when continuous monitoring is carried out for 24 hours or corresponding to a change in an environment in which a camera is used in a monitoring system.

[Means for Resolution] Noting that a sensitivity to a light in a semiconductor image pick-up unit can be controlled optically, an optimum image is obtained by using an optical filter in the semiconductor image pick-up unit.

[Selected Drawing]

Fig. 1

Fig. 1

Camera portion

106	camera portion example
101	lens
102	focal control
103	optical filter housing portion
123	focal driving motor
104	filter driving motor
105	image pick-up unit
113	image pick-up unit
111	optical filter
112	filter driving motor
114	focal driving motor
108	lens
110	optical filter housing portion
109	focal control
122	light
107	camera portion side view
120	rotating gear
119	motor gear
116	black-and-white filter
115	color filter
120	motor gear
121	rotating gear
118	color filter

117 black-and-white filter

Fig. 2

Image pick-up unit frequency characteristic

Level

Black-and-white filter

Infrared characteristic

Color filter characteristic

Visible light region

Infrared region

Fig. 3

Systematic view

301 lens portion

302 optical filter

306 image amplifier

307 image amplifier

303 image pick-up unit

308 display

310 image output

312 motor

304 optical filter drive

305 sensor

311 detector

309 transmission I/F

Fig. 4

Operation flow

401 Pick up an image

402 Decide the quality of the image

403 Instruction sent from a center apparatus

404 An image level is sufficient

405 Drive an optical filter

406 Set an infrared filter

407 Output a color image

408 Display on a monitor in a monitoring center

409 The image level is insufficient

410 Drive the optical filter

411 Set a black-and-white filter

412 Output a black-and-white image

413 Instruction for outputting a character display

414 Output a character display